

CLAIMS

1 1. (currently amended) A method for pre-distorting an input signal, comprising:
2 generating, based on the input signal, a first signal corresponding to a first portion of a first
3 transfer function, wherein the first portion of the first transfer function corresponds to a first voltage
4 range of the input signal;
5 generating, based on the input signal, a second signal corresponding to a second portion of the first
6 transfer function, wherein the second portion of the first transfer function corresponds to a second
7 voltage range of the input signal different from the first voltage range of the input signal;
8 combining the first and second signals to generate a first combined signal corresponding to the
9 first transfer function; and
10 pre-distorting the input signal based on the first combined signal.

1 2. (original) The invention of claim 1, wherein:
2 the first transfer function corresponds to amplitude characteristics of an amplifier; and
3 the amplitude of the input signal is adjusted based on the first combined signal.

1 3. (original) The invention of claim 1, wherein:
2 the first transfer function corresponds to phase characteristics of an amplifier; and
3 the phase of the input signal is adjusted based on the first combined signal.

1 4. (original) The invention of claim 3, further comprising:
2 generating, based on the input signal, a third signal corresponding to a first portion of a second
3 transfer function corresponding to amplitude characteristics of the amplifier;
4 generating, based on the input signal, a fourth signal corresponding to a second portion of the
5 second transfer function;
6 combining the third and fourth signals to generate a second combined signal corresponding to the
7 second transfer function; and
8 adjusting the amplitude of the input signal based on the second combined signal.

1 5. (original) The invention of claim 4, further comprising detecting the envelope of the
2 input signal, wherein:
3 the first and second signals are generated based on the envelope-detected input signal;
4 the first signal is generated by DC-shifting the envelope-detected input signal; and
5 the first and second signals are generated using different non-linear analog circuits that model
6 different portions of the first transfer function.

1 6. (original) The invention of claim 1, further comprising detecting the envelope of the
2 input signal, wherein the first and second signals are generated based on the envelope-detected input
3 signal.

1 7. (original) The invention of claim 6, wherein the first signal is generated by DC-shifting
2 the envelope-detected input signal.

1 8. (original) The invention of claim 1, wherein the first and second signals are generated
2 using different non-linear analog circuits that model different portions of the first transfer function.

1 9. (original) The invention of claim 1, further comprising:
2 differentiating a first portion of the first combined signal to generate a differentiated signal; and

3 combining the differentiated signal with a second portion of the first combined signal to generate
4 a frequency-dependent combined signal, wherein the input signal is pre-distorted based on the frequency-
5 dependent combined signal.

1 10. (original) The invention of claim 1, further comprising:
2 generating a frequency-dependent pre-distortion signal; and
3 combining the frequency-dependent pre-distortion signal with the first combined signal to
4 generate a frequency-dependent combined signal, wherein the input signal is pre-distorted based on the
5 frequency-dependent combined signal.

1 11. (currently amended) An apparatus for pre-distorting an input signal, comprising:
2 means for generating, based on the input signal, a first signal corresponding to a first portion of a
3 first transfer function, wherein the first portion of the first transfer function corresponds to a first voltage
4 range of the input signal;
5 means for generating, based on the input signal, a second signal corresponding to a second
6 portion of the first transfer function, wherein the second portion of the first transfer function corresponds
7 to a second voltage range of the input signal different from the first voltage range of the input signal;
8 means for combining the first and second signals to generate a first combined signal
9 corresponding to the first transfer function; and
10 means for pre-distorting the input signal based on the first combined signal.

1 12. (original) The invention of claim 11, wherein:
2 the first transfer function corresponds to amplitude characteristics of an amplifier; and
3 the amplitude of the input signal is adjusted based on the first combined signal.

1 13. (original) The invention of claim 11, wherein:
2 the first transfer function corresponds to phase characteristics of an amplifier; and
3 the phase of the input signal is adjusted based on the first combined signal.

1 14. (original) The invention of claim 13, further comprising:
2 means for generating, based on the input signal, a third signal corresponding to a first portion of
3 a second transfer function corresponding to amplitude characteristics of the amplifier;
4 means for generating, based on the input signal, a fourth signal corresponding to a second portion
5 of the second transfer function;
6 means for combining the third and fourth signals to generate a second combined signal
7 corresponding to the second transfer function; and
8 means for adjusting the amplitude of the input signal based on the second combined signal.

1 15. (original) An apparatus for pre-distorting an input signal, comprising:
2 a main signal path comprising a first element adapted to pre-distort the input signal based on a
3 first control signal; and
4 a control signal path adapted to generate the first control signal and comprising:
5 an envelope detector adapted to detect the envelope of the input signal;
6 a DC-level-shifting circuit adapted to DC-shift a first copy of the envelope-detected input
7 signal;
8 a first non-linear circuit adapted to generate, based on the DC-shifted, envelope-detected
9 input signal, a first signal corresponding to a first portion of a first transfer function;
10 a second non-linear circuit adapted to generate, based on a second copy of the envelope-
11 detected input signal, a second signal corresponding to a second portion of the first transfer function; and

12 a first combiner adapted to combine the first and second signals to generate a first
13 combined signal corresponding to the first transfer function, wherein the first control signal is based on
14 the first combined signal.

1 16. (original) The invention of claim 15, wherein:
2 the first transfer function corresponds to amplitude characteristics of an amplifier; and
3 the first element is an attenuator adapted to adjust the amplitude of the input signal based on the
4 first control signal.

1 17. (original) The invention of claim 15, wherein:
2 the first transfer function corresponds to phase characteristics of an amplifier; and
3 the first element is a phase adjuster adapted to adjust the phase of the input signal based on the
4 first control signal.

1 18. (original) The invention of claim 17, wherein:
2 the main signal path further comprises an attenuator adapted to adjust the amplitude of the input
3 signal based on a second control signal; and
4 the control signal path is further adapted to generate the second control signal and further
5 comprises:
6 a third non-linear circuit adapted to generate, based on the DC-shifted, envelope-detected
7 input signal, a third signal corresponding to a first portion of a second transfer function corresponding to
8 amplitude characteristics of the amplifier;
9 a fourth non-linear circuit adapted to generate, based on the envelope-detected input
10 signal, a fourth signal corresponding to a second portion of the second transfer function; and
11 a second combiner adapted to combine the third and fourth signals to generate a second
12 combined signal corresponding to the second transfer function, wherein the second control signal is
13 based on the second combined signal.

1 19. (original) The invention of claim 18, wherein the first and second non-linear circuits are
2 analog circuits.

1 20. (original) The invention of claim 15, wherein the first and second non-linear circuits are
2 analog circuits.

1 21. (original) The invention of claim 15, wherein the control signal path further comprises:
2 a differentiator adapted to differentiate a first portion of the first combined signal to generate a
3 differentiated signal; and
4 a second combiner adapted to combine the differentiated signal with a second portion of the first
5 combined signal to generate a frequency-dependent combined signal, wherein the first control signal is
6 based on the frequency-dependent combined signal.

1 22. (original) The invention of claim 15, further comprising:
2 an additional set of circuitry adapted to generate a frequency-dependent pre-distortion signal; and
3 a second combiner adapted to combine the frequency-dependent pre-distortion signal with the
4 first combined signal to generate a frequency-dependent combined signal, wherein the first control signal
5 is based on the frequency-dependent combined signal.

1 23. (new) A method for pre-distorting an input signal, comprising:
2 detecting the envelope of the input signal;

3 generating, by DC-shifting the envelope-detected input signal, a first signal corresponding to a
4 first portion of a first transfer function;

5 generating, based on the envelope-detected input signal, a second signal corresponding to a
6 second portion of the first transfer function;

7 combining the first and second signals to generate a first combined signal corresponding to the
8 first transfer function; and

9 pre-distorting the input signal based on the first combined signal.

1 24. (new) A method for pre-distorting an input signal, comprising:

2 generating, based on the input signal, a first signal corresponding to a first portion of a first
3 transfer function;

4 generating, based on the input signal, a second signal corresponding to a second portion of the
5 first transfer function;

6 combining the first and second signals to generate a first combined signal corresponding to the
7 first transfer function;

8 differentiating a first portion of the first combined signal to generate a differentiated signal;

9 combining the differentiated signal with a second portion of the first combined signal to generate
10 a frequency-dependent combined signal; and

11 pre-distorting the input signal based on the frequency-dependent combined signal.

1 25. (new) A method for pre-distorting an input signal, comprising:

2 generating, based on the input signal, a first signal corresponding to a first portion of a first
3 transfer function;

4 generating, based on the input signal, a second signal corresponding to a second portion of the
5 first transfer function;

6 combining the first and second signals to generate a first combined signal corresponding to the
7 first transfer function;

8 generating a frequency-dependent pre-distortion signal;

9 combining the frequency-dependent pre-distortion signal with the first combined signal to
10 generate a frequency-dependent combined signal; and

11 pre-distorting the input signal based on the frequency-dependent combined signal.